

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
21 July 2005 (21.07.2005)

PCT

(10) International Publication Number
WO 2005/066472 A1

(51) International Patent Classification⁷: **F01N 11/00**,
F02D 41/02, 41/14

(21) International Application Number:
PCT/JP2004/019803

(22) International Filing Date:
27 December 2004 (27.12.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2004-001017 6 January 2004 (06.01.2004) JP
2004-353309 6 December 2004 (06.12.2004) JP

(71) Applicant (for all designated States except US): **TOYOTA JIDOSHA KABUSHIKI KAISHA** [JP/JP]; 1, Toyota-cho, Toyota-shi, Aichi, 4718571 (JP).

(72) Inventors; and

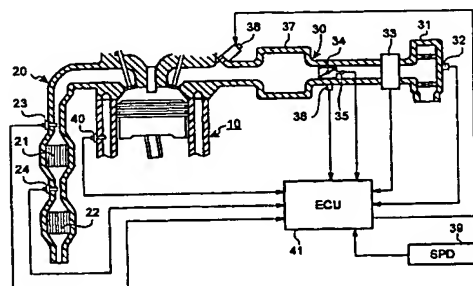
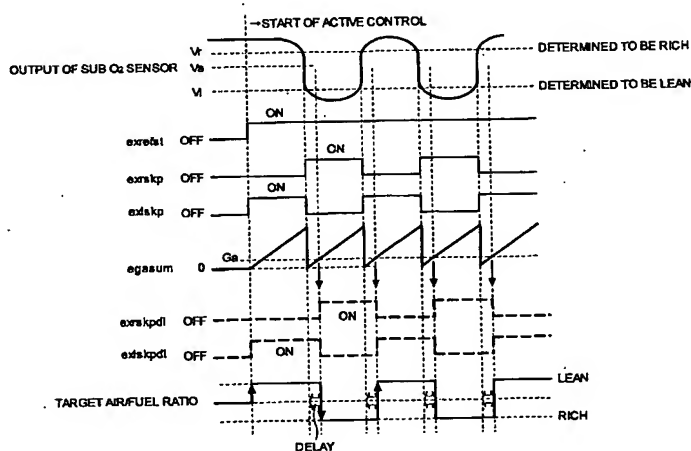
(75) Inventors/Applicants (for US only): **KOHARA, Yulchi** [JP/JP]; c/o TOYOTA JIDOSHA KABUSHIKI KAISHA, 1, Toyota-cho, Toyota-shi, Aichi, 4718571 (JP). **UCHIDA, Takahiro** [JP/JP]; c/o TOYOTA JIDOSHA KABUSHIKI KAISHA, 1, Toyota-cho, Toyota-shi, Aichi, 4718571 (JP).

(74) Agent: **SAKAI, Hiroaki**; Sakai International Patent Office, Tokyo Club Building, 2-6, Kasumigaseki 3-chome, Chiyoda-ku, Tokyo 1000013 (JP).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: APPARATUS FOR EVALUATING DETERIORATION CONDITION OF CATALYST OF INTERNAL COMBUSTION ENGINE



(57) Abstract: To provide an apparatus for evaluating the deterioration condition of a catalyst of an internal combustion engine that can improve the accuracy of an evaluation of the deterioration condition of a catalyst and can suppress a worsening of emissions. The apparatus forcibly sets the air/fuel ratio upstream of a catalyst provided in an exhaust system of an internal combustion engine at a rich condition or a lean condition on the basis of a detected value of a sub O₂ sensor downstream of the catalyst in the internal combustion engine and evaluates the deterioration condition of the catalyst. The air/fuel ratio control is reversed so that the air/fuel ratio upstream of the catalyst becomes a lean condition or a rich condition when 'egasum' has reached a predetermined value Ga, 'egasum' being an integrated value of an admitted air volume (an integration count of the amount of exhaust gas passing through the catalyst) in the period after the sub O₂ sensor outputs a detected value, which shows a rich condition or a lean condition, until the reversing of the output of the sub O₂ sensor.



(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *with international search report*